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ABSTRACT

In this speech, the author discusses the implications of implementing a system for analyzing the utilization of instructional resources. The system translate established instructional theory into components and procedures of the instructional process, thus providing a vehicle for further development and testing of instructional theory. It also contributes to instructional improvements at the classroom level by providing teachers with detailed, concrete procedures for developing instructional strategies which are consistent with theory. The system can be used to generate alternative instructional strategies and provides the basic data for comparing the cost effectiveness of alternative strategies. (Author)

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Implications of the Resource Analysis for Instructional Improvement (RAII) System for Educational Researchers, Developers, and Practitioners

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What is RAII?

The Resource Allocation System (RAII) is a set of systematic procedures developed to assist instructional personnel in designing instruction and in allocating instructional resources. The system is based on the premise that resource allocation decisions should be based on the requirements of the instructional design rather than instructional design being dictated by incidentally available resources. Typically, teachers have planned instruction to fit relatively fixed: time schedules, space arrangements, staffing patterns, equipment inventories, and student group sizes. The RAII System would have the teachers first systematically determine instructional strategies, and second, to allocate time, space, equipment, material, and students according to the strategies selected.

The selection of instructional strategies and allocation of resources are based on Gagné's research on the conditions of learning (Gagné, 1970) and the Briggs (1970) model for instructional design. There are five steps in the basic design component of the RAII System. These are:

Step 1. - State the unit goals and describe entering learner characteristics.

Step 2. - State performance objectives and determine the "domain of learning" (Gagné, 1971), for each objective.

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Step 3. - Sequence the objectives.

Step 4. - Select instructional procedures for objectives from a catalog of procedures and organize into two alternative instructional strategies.

Step 5. - Identify specific resources required for each alternative strategy and select the strategy to be used.

This series of steps is superficially similar to those of other instructional design models. However, the RAII System includes several features which make it unique. One of the more important features is the set of decisions, and the criteria on which they are based, used in selecting instructional procedures for objectives. First, is the identification of the domain in which the objective belongs. Gagné has proposed the domains "to distinguish the parts of a content area which are subject to different instructional treatments" (Gagné, 1971). After two years of intensive work in this area we believe that his conceptualization of the domains is sound, and that identification of the domain to which an objective belongs is a highly useful step in selecting instructional procedures.

Second, the planner decides whether the instructional experiences will be directed by an instructor, the material itself, or by the student. Third, the planner decides whether the pace at which a student proceeds through the material will be adapted to each individual, a small group of 3-8 learners, or to a larger group or the entire class. Finally, the system guides the teacher in the selection of procedures from those considered to be most appropriate in terms of the types of students, objective, pacing, and management specified by the teacher.

In addition, the supporting procedures and worksheets which have been developed and field-tested for this model make it usable by classroom teachers after only approximately 4 hours of guided study.

What Does the RAII System Do?

While the Unit Design component is the cornerstone of RAII, the total system includes several components dealing with instructional design and resource allocation at the macro or program level as well as at the micro or unit level.

The unit level components are concerned with the design, evaluation, and revision of units of instruction spanning a two- to six-weeks period. These components have been field tested and validated for use by classroom teachers.

Course level components are available for the analysis of current courses to identify units needing improvement. These components have performed adequately in a limited number of school situations, but require further field testing.

Program level components are under development to deal with program-wide curriculum planning, resource allocation, and the removal of constraints on the implementation of RAII designed instruction.

The system, in its present state, will enable a school staff to:

(1) analyze current instruction in order to decide
   a. which units are important and effectively taught at present.
   b. which units are relatively unimportant and subject to elimination or replacement.
   c. which units are important but in need of revision.

(2) plan new instruction to provide the essential conditions of learning for those units in need of revision. (validated)

(3) specify resources which are both appropriate and economical for a selected instructional strategy. (validated)

(4) analyze constraints on the implementation of selected strategies and either remove the constraints or revise the instructional plans. (developed)

(5) formatively evaluate the instructional strategy as it is implemented in the classroom. (validated)

In addition, a component has been conceptualized for determining the cost utility index for each unit of instruction, however, procedures for its implementation have not been developed.

Implications of RAII

In discussing the implications of RAII for the practitioner, we would like to give equal stress to the possible applications of the system and to the limitations of the system in its present state of development. Implications for the developer relate to the use of RAII to facilitate process development (e.g., flexible staffing) and product development (e.g., prepackaged instruction). Finally, we will discuss certain implications of RAII for teacher training and educational research.

Current and Planned Applications

Current and planned applications, primarily of the validated components, focus on the development of performance based instruction in higher education as well as in elementary and secondary schools. Most of this developmental work is in conjunction with statewide school accountability, teacher certification, and curriculum development programs.

Examples of such applications include:

(1) the development of performance based instruction in several Florida school districts under contract with the State R & D Program.

(2) the development of career education programs in Leon County, Florida.

(3) assisting individual faculty members improve instruction at Florida State University, Florida A & M University, and Weber State College, Utah.

(4) modularizing twelve multi-section education courses at Weber State College.

(5) providing technical assistance for business teachers whose students must meet minimum performance standards under new teacher certification system in Utah.

It should be noted that these applications all occur in R & D situations where both an institutional commitment to and support for performance based instruction clearly exists. Field tests have indicated that teachers are more likely to implement RAII designed instruction and resource utilization in schools already committed to program improvement through performance based instruction. It is also clear that, while limited applications of RAII can be made by individual teachers or small groups of teachers, organizational and time constraints seriously inhibit effective program-wide application of RAII in its present state. The completion of program level components for flexible scheduling and staff utilization should remedy this limitation.

Implications for Flexible Staffing

The Course and Unit level components, which currently provide for team planning of instruction, can be extended to provide for team teaching. When combined with flexible scheduling, RAII provides a unique basis for differentiated or flexible staffing. Most staffing projects begin with task analyses and end with assignment of responsibilities, presumably in terms of staff interests and abilities. In practice, if not theory, this approach has revealed several shortcomings. First, task analysis is seldom carried to the

instructional design level. Second, task performance, i.e., how to accomplish the task, is seldom specified and standardized to insure the quality of performance and the interfacing of diverse staff activities. RAII goes beyond task analysis to provide a validated set of standard procedures for task accomplishment at the instructional level, as well as at the managerial level. Moreover, RAII provides for flexibility in four important respects: (1) it provides a framework for both vertical and horizontal differentiation; (2) the decisions of, "who does what" depends on the specific program objectives at hand; (3) such decisions are strongly influenced by those responsible for implementing them; and (4) a comprehensive set of instructional and managerial options is provided.

Implications for Pre-Packaged Instruction

One of the continuing difficulties with centralized curriculum development projects is that the materials are developed independently of the total instructional process and therefore ignore important student characteristics and classroom management considerations. Consequently, there has been growing interest in pre-packaged instruction, or learning activity packages which provide materials-managed instruction rather than instructional materials per se. The use of RAII would insure a standard, comprehensive approach to the design of such packages, and to quality control through built-in formative evaluation and revision procedures. This application may have the greatest potential of all, since it could produce validated, student and materials managed instruction which might actually free teacher time for individualized instruction. Moreover, this application would not require extensive reorganization of staff, nor other disruptive developmental activities.

Implications for Diffusion

The essential criteria for diffusion of instructional units are costs, general utility, and transferability. That is, the instructional units most worthy of diffusion are those which are relatively low in cost, judged to be of considerable value to many children, and consisting of clearly specified procedures and generally available resources.

The RAII System, fully implemented, would provide the necessary information on cost, on effectiveness with students of known characteristics and numbers, and on judged value or utility. RAII designed units which meet these criteria for cost and utility could be examined in terms of criteria for transferability. Unit plans would first be checked for feasibility in terms of management characteristics and resource requirements, including teacher conpetencies. Feasible units would then be expanded to provide alternatives for specific instructional procedures or techniques which might prove difficult for other teachers. The final step would involve documentation of results obtained by two or three teachers on a trial basis.

Obviously, such cost-utility based diffusion is possible only with highly specific instructional plans and with routine documentation of cost, effectiveness, and utility information.

Implications for Teacher Training

Pre-service teacher-training programs typically provide the teacher with pedagogical principals and instructional theories with the expectation that teachers will integrate and apply this information when confronted with the responsibility for teaching. Thus, the teacher has received relatively little training, as opposed to information, until he or she is employed to work with children in the classroom. Unfortunately, the novice teacher seldom has the

time or the experience necessary to translate vague notions of pedagogy into effective classroom practices and instructional strategies. The RAII System could be useful in bridging the gap between educational theory and practice, especially when used in a program designed to integrate teacher education in the college classroom with teacher training in the public schools over a two- or three-year period. Since RAII components (and similar developmental systems) have the characteristics of programmed instruction, they could be used on or off campus with much less supervision and effort than is now required to accomplish similar objectives.

Implication for Educational Research

The emphasis on developmental systems also has significant implications for research and instruction in a College of Education. First, a developmental system must be based on some pragmatic integration of the research findings and theory relating to the objective of the developmental system. For instance, the RAII System is based on the research synthesized in the instructional theory and models of Robert Gagné and Leslie Briggs. To the extent that the instructional theory and models are accurately represented in the system, RAII provides one test of the utility of these theories and models at the classroom level under prevailing field conditions. Developmental systems also can be useful in identifying needed, relevant research problems. In conceptualizing a system, it is necessary to provide decision criteria for all practitioner activities required to achieve a specified outcome, and the theoretical and empirical basis for these decision rules is often minimal or non-existent. A developmental system is therefore an excellent source of specific, well-delineated research problems, the results of which can be directly applied to the improvement of the system, and hence to the improvement of educational practice.

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